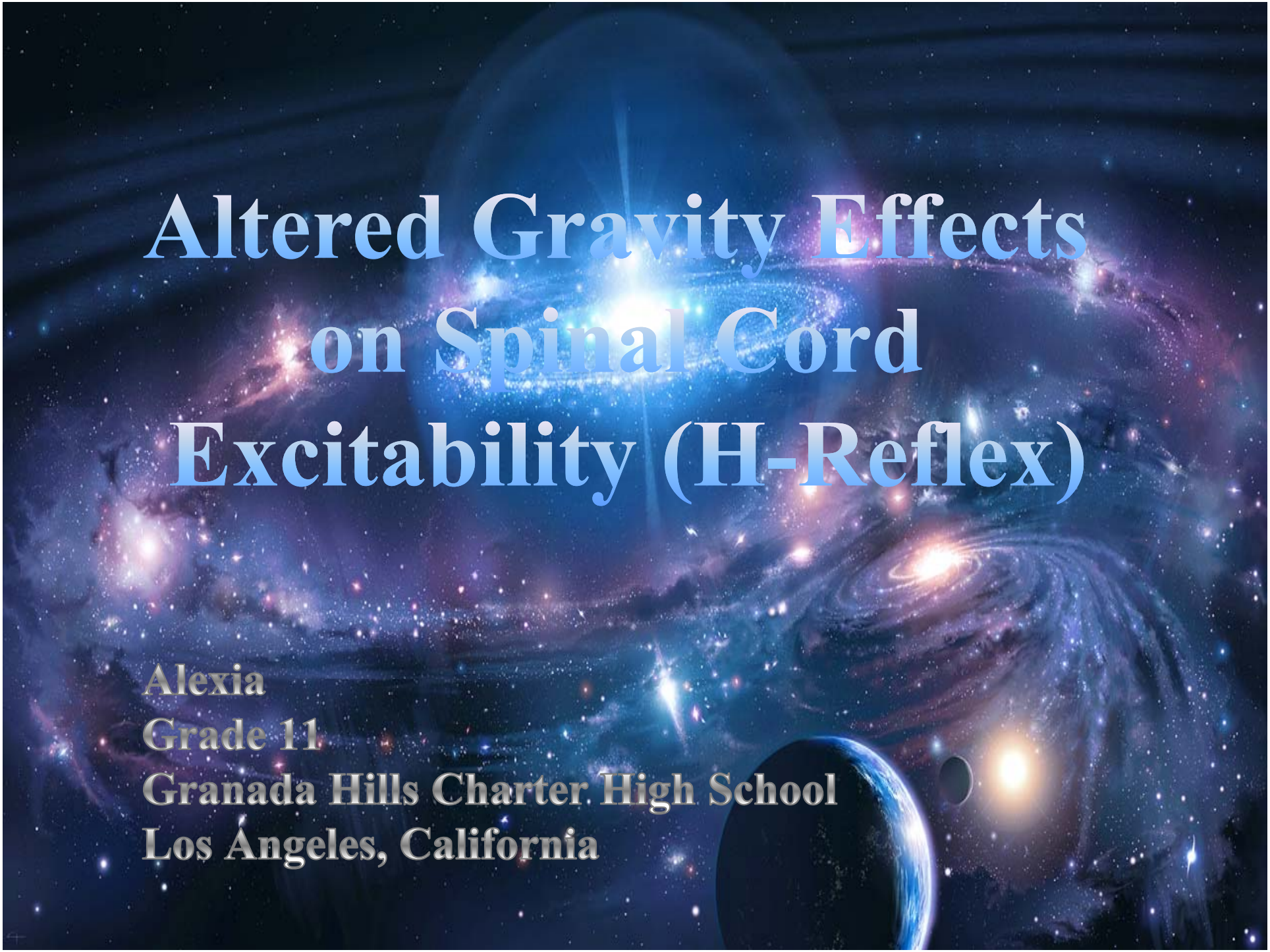

Altered Gravity Effects on Spinal Cord Excitability (H-Reflex)

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- Principle Investigator: Douglas Watt, M.D., Ph.D., McGill University, Montreal, Quebec, Canada
- Previous ISS Missions Related experiments on Skylab, STS-9, STS-41G, STS-61, STS-40, STS-42, STS-52, STS-58, STS-78 and Increments 2, 3 and 4.
- ISS Expedition Duration: March 2001 - June 2002

What were they trying to learn through the experiment?

- Watt and his associates wished to confirm that spinal cord strength gradually diminishes during prolonged exposure to microgravity.
- If spinal cord strength of nerve cells decreased, then the Hoffman reflex measures the extent of the change, how rapidly it occurs, and how long it continues after returning to the ground.

Which missions was the experiment flown on?

Expedition Two, 5A.1, STS-102 Space Shuttle Flight

Continued on Exp. 3 and 4

Skin-tight spacesuit reduces bone loss

http://www.foxnews.com/slideshow/scitech/2010/12/29/ten-amazing-space-innovations/#slide=8

- One of the issues facing astronauts who spend too much time in space -- apart from missing family and aging at a slightly different rate from the rest of us -- is that they suffer bone loss. MIT has invented a new spacesuit, called the Gravity Loading Countermeasure Skinsuit (GLCS), that simulates the effects of gravity on the body and helps reduce bone loss.

What are the Earth and Space applications gained from this experiment?

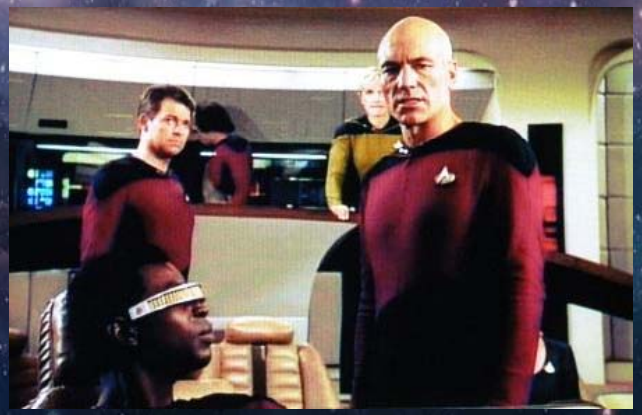
- Help researchers determine if exercise could be made more effective on long space flights
- Better understand assess the physiological risks of long-duration space flight and help better prepare space crews for those flights.
- Reduce the risk of acute and chronic health problems, increase productivity, and make the spacecraft more habitable.
- Determine how much exercise is needed by crewmembers to maintain muscle mass and slow bone calcification.

What were the procedures or steps of the experiment?

- Crew member restrained in a sitting position; stimulating electrodes placed behind knees, recording electrodes placed over lower calf muscles.
- HRTU sends mild electrical shocks of varying strength and times to calf muscles via the stimulating electrodes. Results recorded.
- Repeat 4 times during each expedition's stay at the Station: Three early in flight (pre-docked and docked), once later
- Watt added an additional early session during Expedition 3, after results received during Expedition 2 indicated that an additional session would better define the rate of change in this neurovestibular reflex.
- For comparison, run three times preflight and four times post-flight.

What were the results?

- Spinal cord excitability appears to decrease after approximately 5 days in space (incidental observation from IML). This would make inflight exercise less efficient and/or less effective at maintaining muscle mass and bone calcification.
- It may be possible to reverse the process while still in flight.



Reflection

- I chose the H-Reflex science experiment because I am fascinated with the concept of physical well-being during space travel. I never thought about how living in space might physically affect the crew. Aside from the possible loss of bones, the crew would also lose the ability to distinguish between night and day. This activity taught me the science behind bone loss in space, such as using exercise to counterbalance the effects of weightlessness.